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OPERATING EXPERIENCE WEEKLY SUMMARY

Office of Nuclear and Facility Safety

November 27 - December 3, 1998

Summary 98-48

Operating Experience Weekly Summary 98-48

November 27 through December 3, 1998

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EVENTS

1. OSHA RELEASES COMPLIANCE DIRECTIVE ON THE NEW RESPIRATORY STANDARD

On September 25, 1998, OSHA announced the availability of compliance directive CPL 2-0.120, “Inspection Procedures for the Respiratory Protection Standard.” The directive establishes agency interpretations and enforcement policies and provides instructions to OSHA Regional Administrators and Area Directors to ensure uniform enforcement of the Respiratory Protection Standard, 29 CFR 1910.134 (revised July 1, 1998). The compliance directive is useful to employers who must comply with the standard. The new respiratory standard is applicable when employees wear respirators to protect themselves from exposure to air contaminants above an exposure limit or to otherwise protect their health, where employers require respirators to be worn, and where employees wear respirators voluntarily for comfort or other reasons. A supplementary document, “Questions and Answers on the Respiratory Protection Standard” is also available from OSHA. The compliance directive and the supplementary document are available at www.osha.gov. The Respiratory Protection Standard is available at http://access.gpo.gov/nara/cfr/cfr-table-search.html.

KEYWORDS: compliance, personal protective equipment, respirator

FUNCTIONAL AREAS: Industrial Safety

2. REMOVABLE CONTAMINATION EXCEEDS DOT LIMITS

On November 23, 1998, at the Hanford Solid Waste Project, radiological technicians performing receipt inspections discovered removable contamination on a waste shipment from a General Atomics decommissioning project in San Diego, California. Technicians found removable contamination on the load, on the trailer bed, on a tarpaulin, and on the ground where technicians placed the tarpaulin when they uncovered the load. The maximum contamination level was 35 mrad/hr. No alpha contamination was detected. Investigators reviewed records that indicate that the contamination was within DOT limits for fixed contamination when it left the originator. The originator fixed some of the contamination with a protective coating before shipping. Investigators believe that a portion of the coating failed en route. OEAF engineers will follow the investigation and provide information as it becomes available. (ORPS Report SAN--GOSF-HCF-1998-0001, NRC Preliminary Notification of Event or Unusual Occurrence, PNO-IV-98-057)

KEYWORDS: fixed contamination, removable contamination, transportation

FUNCTIONAL AREAS: Decontamination and Decommissioning, Radiation Protection, Transportation

3. FIRE STATION UNABLE TO RECEIVE FIRE ALARM NOTIFICATIONS

On November 25, 1998, at the Idaho National Engineering and Environmental Laboratory Radioactive Waste Management Complex, a facility manager reported that for approximately 3 weeks, the fire station had been unable to receive fire alarm notifications from several facilities because the fire alarm panels were not functioning as intended. Life safety system technicians discovered the impaired alarm notification system while performing routine monthly heat detector testing. They determined that on November 2, maintenance technicians had replaced a data terminal unit for fire alarm panels with one that contained an incompatible data protocol program. Therefore, the fire alarm panels were unable to recognize any fire alarm signals received from several facilities in the Complex. Telecommunications personnel reprogrammed the data terminal unit with the appropriate protocol and verified that the alarm reporting capability was restored. Failure to properly test the operation of the fire alarm system would have resulted in a delayed notification of the fire department and may have resulted in extensive facility damage had a fire occurred. (ORPS Report ID--LITC-RWMC-1998-0007)

Investigators determined that when the life safety system technicians tested the first heat detector alarm center personnel told them that the heat detector alarm was not received at the central computer, so the technicians began troubleshooting the alarm reporting problem. The technicians determined that none of the fire alarm control panels on one communication loop were reporting alarms to the alarm center and that the data terminal unit for this loop had been replaced 3 weeks earlier.

Investigators determined that the technicians who installed the data terminal unit had completed installation and testing in accordance with an approved work package. They also determined that work planners believed the data terminal replacement would only require post-maintenance testing to confirm that it could communicate with the fire station. The post-maintenance test verified the output from the data terminal unit but not the input. However, the data terminal unit contained a different protocol program that did not recognize the fire alarm input signal, so it was unable to communicate any signals to the fire station. Investigators determined that the monthly heat detector test tested the functionality of the fire alarm notification system better than the post-maintenance test. The facility manager will continue to review this event and will implement corrective actions as necessary.

NFS has reported fire alarm and suppression system deficiencies at Idaho in several Weekly Summaries. Some examples follow.

- Weekly Summaries 98-30, 98-33, 98-38, and 98-43 reported that a high-pressure carbon dioxide (CO_2) fire suppression system unexpectedly actuated resulting in one fatality, several life-threatening injuries, and significant risk to the safety of the initial rescuers. In September 1998, the Office of Oversight for Environment, Safety and Health issued a Type A Accident Investigation Board Report on the accident that identified two root causes. First, Lockheed Martin Idaho Technologies Company (LMITCO), the site operating contractor, did not have a systematic method for identifying, institutionalizing, or implementing requirements for the design, installation, and work conducted on or affected by the CO_2 fire suppression system. Second, the DOE Idaho Operations Office and LMITCO management had accepted unstructured work controls, which helped to increase industrial safety risks to workers. (Weekly Summaries 98-30, 98-33, and 98-38; Type A Accident Investigation Board Report on the July 28, 1998, Fatality and Multiple Injuries Resulting from the Release of Carbon Dioxide at Building 648, Test Reactor Area, Idaho National Engineering and Environmental Laboratory; ORPS Report ID--LITC-TRA-1998-0010)

- Weekly Summary 98-41 reported that electronics technicians discovered a mispositioned trouble/silence switch in a fire supervisory panel. Technicians discovered the trouble/silence switch in the abnormal “silence” position, which suppresses local alarms and transmission of trouble alarms to the main fire alarm control room but does not affect fire alarms. They also discovered a faulty supervisory panel communications card, which prevented transmission of both fire and trouble alarms. Technicians determined that the mispositioned switch had prevented detection of the communications card failure. (ORPS Reports ID--LITC-WASTEMNGT-1998-0019 and ID--LITC-WASTEMNGT-1998-0020)

These events underscore the importance of ensuring that fire protection systems are maintained in operational readiness. Facility managers should ensure that work controls are rigorous enough to prevent unplanned system impairments and to maintain facility and personnel safety during planned impairments. The November 25 event is significant because for approximately 3 weeks no one was aware that the fire alarm system for several facilities was not operating as designed. This event clearly shows that, at a minimum, testing sufficient to determine operability should be performed during upgrade, modifications, and post-maintenance activities of facility systems.

- DOE O 420.1, *Facility Safety*, requires fire protection systems for DOE facilities to include means for notifying and evacuating building occupants and means for summoning a fire department. Fire protection supervisory systems detect conditions indicative of fire, actuate local warnings, transmit notifications to a continuously attended location, and in some cases, actuate systems to extinguish or limit the spread of fire and smoke.

- DOE O 5480.19, *Conduct of Operations Requirements for DOE Facilities*, chapter VIII, "Control of Equipment and System Status," states that DOE facilities are required to establish administrative control programs to handle configuration changes resulting from maintenance, modifications, and testing activities.

- DOE O 5480.22, *Technical Safety Requirements*, defines the terms "operable" and "operability" and provides six implementing principles. General principle 1 states: "A system is considered operable as long as there exists assurance that it is capable of performing its specified safety function(s)." Surveillance testing is essential in providing this assurance. The Order defines operability as follows: "a system, subsystem, train, component, or device shall be operable or have operability when it is capable of performing its specified function(s), and when all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication, or other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its functions are also capable of performing their related support function(s)."

- DOE-STD-1050-93, *Guideline to Good Practices for Planning, Scheduling and Coordination of Maintenance at DOE Nuclear Facilities*, section 3.1.1.3, provides the key elements of an effective planning program. The standard also discusses the need for thorough reviews of work packages by experienced individuals to eliminate errors.

- DOE/EH-0513, Safety Notice 95-04, "Post-Maintenance Test Programs," December 1995, provides guidance and good practices for establishing effective post-maintenance test programs. It states that post-maintenance test procedures should be validated against design basis documentation to ensure equipment-specific information is incorporated. Safety Notices can be obtained by contacting the ES&H Information Center, (800) 473-4375, or by writing to U.S. Department of Energy, ES&H Information Center, EH-72, 19901 Germantown Rd., Germantown, MD 20874. Safety Notices are also available at http://tis.eh.doe.gov:80/web/oeaf/lessons_learned/ons/ons.html.

Under the provisions of the Price-Anderson Amendments Act, DOE can fine contractors for violations of Department rules, regulations, and compliance orders relating to nuclear safety requirements. DOE contractors who operate nuclear facilities and fail to implement corrective actions for identified deficiencies could be subjected to Price-Anderson civil penalties under the work processes and quality improvement provisions of 10 CFR 830.120, *Quality Assurance Requirements*. These actions include Notices of Violation and, where appropriate, nonreimbursable civil penalties. The primary consideration for determining whether DOE takes enforcement action is the actual or potential safety significance of the violation, coupled with how quickly the contractor acts to identify and correct problems. The Office of Enforcement and Investigation may reduce penalties when a DOE contractor promptly identifies a violation, reports it to DOE, and undertakes timely corrective action. DOE has discretion to not issue a Notice of Violation in certain cases. The Noncompliance Tracking System (Weekly Summaries 95-17 and 95-20) provides a means for contractors to promptly report potential noncompliances and take advantage of provisions in the enforcement policy. DOE-STD-7501-95, *Development of DOE Lessons Learned Programs*, discusses management responsibility for incorporating appropriate corrective actions in a timely manner.

KEYWORDS: configuration control, fire protection, testing

FUNCTIONAL AREAS: Configuration Control, Fire Protection

4. FORK TRUCK CONTACTS 480-V BUS DUCT

On November 23, 1998, at the Rocky Flats Environmental Technology Site, the mast of a fork truck came in contact with an overhead 480-V bus duct. The fork truck driver was moving supplies with the mast extended at the time of the incident. A nearby worker saw an electrical arc come from the bus duct to an adjoining piece of unistrut. Electricians applied a lockout/tagout to the circuits within the bus duct and verified that safe conditions existed, and the facility manager suspended all fork truck operations in the area. Although there was no damage to the fork truck and no injuries to the driver, the failure to recognize the overhead hazard resulted in superficial damage to the bus duct and an electrical near-miss. (ORPS Report RFO--KHLL-NONPUOPS2-1998-0009)

Investigators determined that although the ceiling was approximately 22 feet high, the bus duct was positioned at 11 feet 6 inches from the floor. A 220-V duct also ran next to the 480-V bus duct. Investigators determined that the fork truck driver had driven down an aisle under the bus duct to pick up his load. Because the load was wide, the driver had to raise it in order to clear some crates on each side of the aisle while egressing. With the load raised and the mast extended, the driver continued until he contacted the bus duct.

Managers held a fact-finding meeting and discussed the incident. They learned that the driver was an experienced equipment operator who knew the facility layout and had up-to-date training. Meeting members identified corrective actions, which included (1) conducting walk-downs of the routes of travel beforehand to identify any hazards and (2) using spotters when egressing aisles with extended masts.

When operating fork trucks inside warehouses or buildings, operators should slow down and exercise caution at all cross aisles and other locations where vision is obstructed. They should never back up without looking behind first. As Figure 4-1 shows, they should always know the height of their fork truck and check the clearances, because not all overhead obstructions are marked or posted.

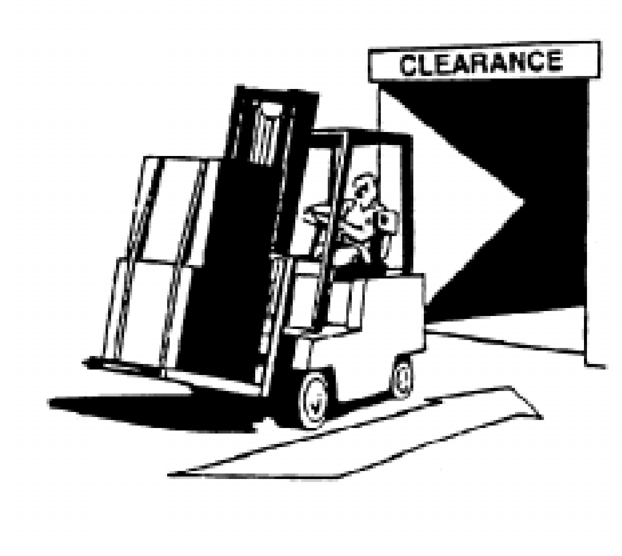

Figure 4-1. Check the Clearances

NFS reported a similar event in Weekly Summary 96-46, where an operator at the Idaho Engineering Laboratory Power Burst Facility backed a forklift into a 480-V power line and a 208-V overhead power bundle with the forklift mast raised. Investigators determined that the forklift operator failed to use a spotter and failed to inspect the overhead area around the work location. Corrective actions included installing concrete barriers to prevent vehicle access near the power lines, adding postings for other overhead obstructions, and requiring area walk-downs to identify potential hazards. (ORPS Report ID--LITC-PBF-1996-0001)

These events demonstrate the importance of safely operating forklifts and fork trucks. Pre-job briefings and training should emphasize the dangers associated with equipment operation. Many events have occurred while drivers were backing up equipment, indicating that they must be more aware of hazards in all directions, including above them. Equipment operators should walk down areas to identify and evaluate overhead hazards. Spotters should be used if equipment will be operated in the vicinity of overhead hazards. In the event of damaged electrical systems or downed lines, personnel should always assume they are energized, until proven otherwise. Even if there is no flow of current, an electrical potential could exist. Personnel should remain inside vehicles that are in contact with downed lines or electrical equipment until authorities have verified that no electrical hazard exists.

KEYWORDS: electrical hazard, forklift, inspection, overhead

FUNCTIONAL AREAS: Industrial Safety, Materials Handling/Storage

5. WORK CONTROL ISSUES RESULT IN UNEXPECTED HAZARDS

This week, OEAF engineers reviewed two recent occurrences involving departures from approved work methods. On November 11, 1998, at the Oak Ridge Environmental Restoration Operations Facility, ironworkers were using an 80-pound electric winch (tugger) to move an overhead bridge crane. The winch broke loose from the crane and fell approximately 20 feet to the roof of a cell enclosure, a metal structure that houses shut-down gaseous diffusion equipment. Because power to the crane was locked out and could not be restored, the work plan required the workers to move it by turning the drive shaft with a pipe wrench. Workers viewed this method as inappropriate for the large number of moves involved and decided to use the tugger instead. Although tuggers have often been used for this type of maintenance, the work plan did not permit their use on this job. On November 18, 1998, at the Savannah River F-Canyon Facility, an operator was exposed to contamination and received a radiation exposure higher than expected while removing a blockage from a dip tube. Based on a pre-job radiation survey of the work area, a job-specific radiological work permit listed a rod or a fish tape as the tools to be used to clear the blockage. The rationale for selecting these tools was to reduce exposure to radiation and contamination by providing distance between the dip tube and the worker. Because they had trouble using the specified tools, the workers used a hammer and screwdriver, which had been used in the past to clear blockages. In each of these occurrences, a departure from approved work methods introduced hazards that had not been analyzed by work planners. (ORPS Reports ORO--BNFL-K33-1998-0013 and SR--WSRC-FCAN-1998-0049)

At Oak Ridge, ironworkers had been moving a 40-ton crane to support electricians who were repairing electrical jumpers in power conductor bars where they cross building expansion joints. This activity required frequent movement of the crane along its rails. Workers welded a tugger to a wheel housing on the crane using four 1-1/2-inch welds applied with a 115-V ac welder. Later investigation revealed that weld penetration was only 1/32-inch and that building supply voltage was 109 V ac instead of the full 115 V ac required for proper welds. After the tugger had been used to move the crane without incident for more than 1,000 feet, the crane cocked slightly and the increased lateral load broke the welds. The power cord for the tugger was routed behind the ironworker operating the winch to a portable generator located on a catwalk. When the winch broke free, the ironworker leaned forward to avoid the power cord. The combination of this movement and the friction of the power cord around his back and arm pulled him into a bridge crane girder at chest height. The bridge crane girder and fall protection equipment worn by the ironworker kept him from falling from the crane. He sustained minor injury to the ligaments of his left elbow, and medical personnel placed him on restricted duty for 7 days. Job supervisors suspended all further work on the crane pending a complete evaluation.

Facility managers concluded from their initial investigation of this occurrence that the workers had not adequately considered the safety implications of the decision to use a tugger. Workers did not expect the tugger welds to fail and did not place themselves in a safe position with respect to the power cable. They did not recognize that low supply voltage to the welder might affect the depth of weld penetration. Finally, they did not revisit the work plan to evaluate hazards that might have resulted from substituting the tugger for the specified method of moving the crane.

At Savannah River, workers were removing a blockage from a dip tube, which is part of an instrument system that measures the level and specific gravity of a canyon waste tank. A radiological control technician monitored the worker who had removed the blockage at the step-off pad for the area. Contamination measured 1,000,000 dpm beta-gamma on the worker's left respirator cartridge and 200,000 dpm beta-gamma on his inner protective coverall. The technician assisted the worker in removing his protective clothing and respirator without spreading contamination. The worker's whole-body dose as measured by personal dosimetry was 10.2 mrem. In the absence of extremity dosimetry, radiological control personnel projected an extremity dose of 300 mrem based on baseline survey data, whole-body dosimetry, and timekeeper records of the job. They placed the worker in a special bioassay sampling program as a precaution.

Facility managers determined from an investigation of this occurrence that work planning personnel had discussed the basis for tool selection during a job planning session, but that this information was not adequately communicated to the night crew during shift turnover. (The night crew actually did the work.) Facility managers concluded that because the worker removed the blockage with a hammer and screwdriver, he did not maintain the intended distance from the radiological source. If closer proximity had been expected, radiological control personnel would have specified extremity dosimetry. Facility managers also concluded that the job should have been supported by technical work documents with sufficient detail for complex radiological work.

The two occurrences underscore the importance of conducting work in accordance with approved work plans. In the Oak Ridge occurrence, an unreviewed change in work methods increased the hazards associated with the task. In the Savannah River occurrence, departure from approved work methods resulted in radiological exposures that were higher than expected.

Each task should be supported by an approved work plan. The amount of detail required for a work plan may vary with the complexity of the task, the degree of hazard involved, and the degree of reliance on skill-of-craft. However, any task that presents significant hazard should have the following minimum support.

- A work instruction that is consistent with task complexity, identified hazards, and expected skills. The instruction should contain clearly worded and highly visible cautions and warnings.

- Pre-job briefings and walk-downs that ensure that workers understand safety measures and have the opportunity to identify and correct hazardous conditions not previously identified. Pre-job briefings should be conducted using a formal checklist or briefing plan to ensure consistent communication of work methods and safety precautions.

- Supervision that ensures that workers adhere to approved work methods and required safety measures.

Worker training should emphasize that changes in work methods or equipment, or any other deviation from an approved work plan, can introduce unforeseen hazards. Changes to approved work methods and equipment must receive the same hazard analysis, review, and approval as the original work plan. Any change should entail a work stoppage combined with a thorough review of the potential hazards associated with the change. Workers should also be trained to stop work and report conditions identified during work that are inconsistent with expected conditions.

DOE O 4330.4B, *Maintenance Management Program*, section 8.3.1, provides guidelines on work control systems and procedures. The Order requires using control procedures to help personnel understand the requirements for working safely. Chapter 6, “Maintenance Procedures,” identifies maintenance procedures and other work-related documents needed to provide appropriate work direction and ensure that maintenance is performed safely and efficiently. Chapter 8, “Control of Maintenance Activities,” states that a work control program establishes the requirements for identifying, planning, approving, and conducting maintenance activities. DOE-STD-1053-93, *Guideline to Good Practices for Control of Maintenance Activities at DOE Nuclear Facilities*, provides extensive guidance for the development of work control plans and the supervision of maintenance activities.

KEYWORDS: hazard analysis, industrial safety, maintenance, work control

FUNCTIONAL AREAS: Electrical Maintenance, Electrical Maintenance, Industrial Safety, Work Planning

6. INCORRECTLY APPLIED PERSONNEL SAFETY LOCKOUT/TAGOUT VIOLATES PROCEDURES

On November 19, 1998, at Los Alamos National Laboratory, the Chemistry and Metallurgy Research (CMR) facility manager determined that Johnson Controls Northern New Mexico (JCNNM) electricians applied a personnel safety lockout/tagout to the wrong circuit breaker in support of pump replacement work. After completion of the work and during removal of the lockout/tagout, CMR operations personnel found that the electricians had applied the lock and tag to a circuit breaker that was not connected to the pump. Although the actual supply breaker did not have a personnel safety lockout/tagout, the breaker was locked open using a configuration control lock per facility procedure. The incorrect administration of the personnel safety lockout/tagout violated Laboratory procedures and resulted in an electrical near-miss. (ORPS Report ALO-LA-LANL-CMR-1998-0042)

CMR facility management and JCNNM personnel had prepared a comprehensive work control package in connection with the replacement of two chill water pumps. An Activity Hazard Analysis (AHA) in the package required a personnel safety (red) lockout/tagout on each local disconnect switch for the pumps. The switches are located near the pumps in the same room. The AHA also required that these tags be placed on top of configuration control (blue) locks applied by facility operations personnel. Supervisors, electricians, and pipe fitters conducted a pre-job briefing and work area review. During the review, JCNNM personnel determined that the lockout isolation point had to be moved from the disconnect switches to the pump circuit breakers. The area work supervisor and JCNNM personnel then prepared red lockout/tagout documentation for the job. The supervisor listed the correct circuits and valves to be locked and tagged on an attachment to the documentation. However, no one modified the AHA to reflect the change in the electrical lockout/tagout.

On November 3, operations personnel correctly applied the blue locks and tags to the circuit breakers at the motor control center (MCC) that supplied power to the chill water pumps. They were not required to notify the area work supervisor that the locks had been applied or where they were located, and the supervisor did not ask. Later that day, two electricians entered the pump room to look at the disconnect switches in order to determine the location of the circuit breakers. They found two disconnect switches for each pump instead of one. One switch was the actual in-service switch and the other was a new switch that had not been connected an upgrade project had been suspended. The in-service switches were not labeled, but the new switches had labels that identified a new circuit breaker that would eventually provide power. The new switches were clearly not electrically connected and were tagged as being disconnected and out-of-service.

The electricians assumed that the information on the label for the new switch also applied to the old switch. Based on this, they placed their red lockout/tagout on the circuit breaker designated on the label. However, this new breaker was located on a new MCC that was not in service. The new MCC was part of the suspended electrical upgrade project and was not labeled as being disconnected or out-of-service. Although the AHA stated that the red lockout/tagout was to be placed over the blue lock, the electricians applied the lockout/tagout even though there was no blue lock on the breaker.

The red lockout/tagout documentation required an independent verification that locks and tags were applied at the correct location. Although the area work supervisor was procedurally required to perform this verification, he delegated responsibility for this to one of the electricians. The electrician thought, mistakenly, that he was being asked to visually verify that the pump disconnect switch was open and there was no voltage measured at the pump. He checked the disconnect switch and performed the zero energy check but did not verify the lockout/tagout.

Investigators determined that although the electricians had incorrectly applied the red lockout/tagout for one of the pumps, they subsequently, and correctly, placed their red locks and tags over the blue lock for the other pump. The location of these red locks and tags was consistent with the location listed in the lockout/tagout documentation.

On November 20, CMR facility management convened a critique of the occurrence. Critique attendees reviewed the incident and ascertained that work planners had recently included the requirement to apply blue locks and tags in the work package, specifying that facility operations personnel and area work supervisors must communicate the location of the locks. Facility management took the following actions.

- Operations personnel prominently labeled all of the not-in-service MCCs installed as part of the upgrades project, "THIS MCC IS NOT IN SERVICE."

- Operations personnel performed a representative sample of the hundreds of new local circuits installed as part of the CMR upgrades project and determined that not-in-service circuits were still properly tagged as being disconnected and out-of-service.

NFS has reported other events where the wrong circuit breaker or piece of equipment was locked and tagged, exposing personnel to a hazard or disrupting facility operations. Following are some examples.

- Weekly Summary 96-41 reported that construction electricians at the Idaho Chemical Processing Plant were exposed to an electrical shock hazard because the wrong breaker had been identified in their work package. When the electricians went to install a lock and tag on an exhaust blower, they discovered the breaker listed in the work package was labeled “spare.” An engineer told them that the label was incorrect and instructed them to proceed with the installation. The electricians opened the breaker, performed a zero energy check, and found the circuit was still energized. (ORPS Report ID--LITC-WASTEMNGT-1996-0013)

- Weekly Summary 96-39 reported that electricians at Argonne National Laboratory—West opened the wrong breaker while preparing to conduct electrical maintenance on a 13.8-kV breaker, resulting in a loss of power at the Fuel Conditioning and Hot Fuel Examination Facilities. Investigators determined that the pre-job briefing was inadequate and that communication between the electricians was inadequate because it did not convey which breakers to open. (ORPS Report CH-AA-ANLW-ANLW-1996-0008)

These events underscore the need for personnel to ensure that the lockout/tagout process is properly administered. Lockout/tagout holders should verify that the locks and tags have been correctly installed on the isolation boundaries. The event at CMR also illustrates the importance of having a questioning attitude; for example, the electricians went ahead and applied their red lockout/tagout even though a blue lock was not on the circuit breaker, as expected. Another issue was the failure to label equipment that had not been placed in service, adding to the confusion of the electricians. A common practice in the commercial nuclear industry and the military is to include equipment identifiers and location information on the lockout tags. This practice would have eliminated the need for the electricians to check the disconnect switches for a circuit designation. The following references address lockout/tagout requirements and provide guidance for independent verification.

- DOE-STD-1030-96, *Guide to Good Practices for Lockouts and Tagouts*, provides guidance on lockout/tagout program implementation and management at DOE facilities.

- DOE O 5480.19, *Conduct of Operations Requirements for DOE Facilities*, chapters IX, “Lockouts and Tagouts,” provides guidance for equipment status control and protection of personnel from injury and equipment from damage through component tagging and locking.

- DOE-STD-1036-93, *Guide to Good Practices for Independent Verification,* states that independent verification should always be performed after installation of a lockout/tagout to ensure adequate protection for workers. Section 4.3.7, "Verifying Locked/Tagged Components," states that the verifier should verify that the correct component has been identified and that the component is in the position stated on the danger tag.

- OSHA regulations contain several references to lockout/tagout. These include 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*; 29 CFR 1910.333, *Safety-Related Work Practices*; 29 CFR 1910.269, *Electric Power Generation, Transmission, and Distribution*; and 29 CFR 1926.417, *Lockout and Tagging of Circuits*.

- Two Safety Notices and one Safety Note on this subject have been issued: DOE/EH-0540, Safety Notice 96-05, *Lockout/Tagout Programs*; DOE/EH-0502, Safety Notice 95-02, *Independent Verification and Self-Checking*; and DOE/EH-0180, Safety Note, 91-04, *Control of Hazardous Energy*.

- DOE-EH-33, *Hazard and Barrier Analysis Guide,* provides techniques and tools for determining the effectiveness of barriers such as the lockout/tagout for the safe execution of work.

Safety Notices 96-05 and 95-02 can be obtained by contacting the ES&H Information Center, (800) 473-4375, or by writing to U.S. Department of Energy, ES&H Information Center, EH-72, 19901 Germantown Rd., Germantown, MD 20874. Safety Notices are also available at http://tis.eh.doe.gov:80/web/oeaf/lessons_learned/ons/ons.html. A copy of the *Hazard and Barrier Analysis Guide* is available from Jim Snell, (301) 903-4094, and may also be obtained by contacting the ES&H Information Center, (800) 473-4375, or by writing to U.S. Department of Energy, ES&H Information Center, EH-72, 19901 Germantown Rd., Germantown, MD 20874.

KEYWORDS: communication, inattention to detail, independent verification, labeling, lockout and tagout

FUNCTIONAL AREAS: Operations, Electrical Maintenance

OEAF FOLLOW-UP ACTIVITY

1. CORRECTION TO WEEKLY SUMMARIES 98-06, 98-33, and 98-46

The following Weekly Summary articles incorrectly referenced the Nuclear Regulatory Commission sealed source database.

- Weekly Summary 98-06, Article 1
- Weekly Summary 98-33, Article 3
- Weekly Summary 98-46, Article 4

The correct reference is http://www.nrc.gov/NRC/FEDWORLD/NRC-SSD/index.html.

OEAF engineers greatly appreciate the positive support and feedback we receive while developing the Weekly Summary and welcome the chance to correct any errors our readers find.

KEYWORDS: sealed source, accountability, radiation protection

FUNCTIONAL AREAS: Radiation Protection